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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/538,563	06/15/2005	Edwin Rijpkema	NL021330	9446
65913	7590	04/29/2008	EXAMINER	
NXP, B.V. NXP INTELLECTUAL PROPERTY DEPARTMENT M/S41-SJ 1109 MCKAY DRIVE SAN JOSE, CA 95131			KAO, JUTAI	
			ART UNIT	PAPER NUMBER
			2616	
			NOTIFICATION DATE	DELIVERY MODE
			04/29/2008	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip.department.us@nxp.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/538,563	<b>Applicant(s)</b> RIJPKEMA, EDWIN	
	<b>Examiner</b> JUTAI KAO	<b>Art Unit</b> 2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 01 February 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,4-6 and 9-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4-6 and 9-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

Amendments made to the application filed on 02/01/2008 have been accepted and entered into prosecution. The amendment cures the 35 USC 112 rejection placed in the previous action, the corresponding rejection is therefore withdrawn.

### ***Response to Arguments***

1. Applicant's arguments filed 02/01/2008 have been fully considered but they are not persuasive.

Regarding amended claim 1, the applicant argues that the cited prior art fails to teach the claim limitation of storing only one unit of guaranteed throughput data at a time. However, as shown in the previous rejection, cited prior art, Chiussi, does show a buffer storing one flow of guaranteed throughput data at a time (with "flow" being the unit of guaranteed throughput data; although flow may not disclose the actual size of the buffer, it is nevertheless a unit of data).

Regarding amended claim 5, the applicant argues that Chiussi does not show the reservation of inputs and/or outputs. Specifically, the applicant argues that although Chiussi does show that links are occupied by the scheduled frame, mere "occupation" of the link does not constitute a "precursor reservation operation". However, since the transmission of the frames are "scheduled" by the primary and secondary weighted-round-robin schedulers (PWS 401 and SWS 404 in Fig. 4), for the links corresponding

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to the schedulers, the "scheduling" operation could be considered the "precursor reservation operation" that reserves the outputs.

Regarding new claims 11-21, it has been determined that all claimed limitations are supported by the original specification.

### ***Claim Objections***

2. Claims 4 and 19 are objected to because of the following informalities: minor errors.

Regarding claim 4, the claim now depends on canceled claim 2.

Regarding claim 19, at the end of the second line of the claim, the phrase "schedule the best effort data and three steps" is believed to mean "schedule the best effort data in three steps".

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 4-6 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiussi (US 2003/0142624) in view of Odman (US 2003/0152059).

Chiussi discloses a method for integrating guaranteed-bandwidth and best-effort traffic in a packet network including the following features.

Regarding claim 1, a data switching device (see device 101-1 in Fig. 2) comprising inputs (see input links 201-1 to 201-s in Fig. 2) for guaranteed throughput and best effort data (see Fig. 5, which shows the incoming Guaranteed Bandwidth (GB) flows 402 and Best Effort (BE) flows 405), outputs (see output links 202-j and 202-s in Fig. 2), a data switch interconnecting the inputs and outputs (see switch fabric 250 in Fig. 2), guaranteed throughput control means coupled for controlling a guaranteed throughput data scheduling (see PWS 401 in Fig. 4) and best effort control means coupled for controlling a best effort data scheduling (see SWS 404 in Fig. 4), characterized in that the guaranteed throughput and best effort control means are arranged for a combined control (see PWS 401, combining GB flows 402 and BE flows via the SWS 404 in Fig. 4) such that the best effort data scheduling is based on a contention free guaranteed throughput scheduling (see “serves the BE aggregate only after having granted to the GB aggregate the sum of the guaranteed service shares of the allocated GB flows” recited in paragraph [0040]); wherein the data-switching device has at least one guaranteed throughput input buffer for at least one data switch input (see flow queues 502 in Fig. 5); wherein the at least one guaranteed throughput input buffer stores only one unit of guaranteed throughput data at a time (see Fig. 5, where each flow queue 502 only carries one GB flow).

Regarding claim 4, wherein the data-switching device has one and the same output buffer both for collecting guaranteed throughput and best effort data (see packet

RAM 607 in Fig. 6, which carries all packets to be transmitted by the packet transmitter 601, including both the GB and BE flows, as recited in paragraph [0048]).

Regarding claim 5, a data switching method (see switch fabric 250 in Fig. 2), wherein guaranteed throughput and best effort data is scheduled for switching (see Fig. 4, which schedules both GB and BE flows using primary and secondary weighted-round-robin schedulers (PWS and SWS) 401 and 404), characterized in that the best effort data scheduling is based on a contention free guaranteed throughput data scheduling (see “serves the BE aggregate only after having granted to the GB aggregate the sum of the guaranteed service shares of the allocated GB flows” recited in paragraph [0040]); characterized in that the guaranteed data scheduling takes one step (see Fig. 4, where the GB flows gets scheduled by only going through the PWS scheduling step 401); the one step involves a reservation of inputs and/or outputs (see Fig. 4, where the PWS puts the GB flow within the subframe 407, and sending the frame to the outgoing link, thus reserving an output link for the GB flow).

Regarding claim 6, characterized in that the best effort scheduling is performed after the guaranteed throughput scheduling (see “serves the BE aggregate only after having granted to the GB aggregate the sum of the guaranteed service shares of the allocated GB flows” recited in paragraph [0040]; or see “first...the PWS 401 fulfills the bandwidth requirements of the GB flows” and “second...the PWS 401 distributes fair service to the plurality of BE flows” recited in paragraph [00043]).

Regarding claim 9, wherein the best effort data scheduling takes one or more multiples of three steps, including the steps: request, grant and accept (see “the single

WRR scheduler grants 0.66 r to the GB flow that remains backlogged, while each BE flow gets 1.66% of the capacity of the server...” recited in paragraph [0039], which shows how the WRR scheduler grants 1.66% of the capacity to the BE flows).

Chiussi does not specifically disclose the following features: regarding claims 1 and 5, wherein the guaranteed throughput scheduling is contention free.

Odman discloses a method for handling asynchronous data in a wireless network including the following features.

Regarding claims 1 and 5, wherein the guaranteed throughput scheduling is contention free (see contention free period 530 in Fig. 5 which includes guaranteed time slots 540, which are used to transmit “isochronous” data, as recited in paragraph [0034]).

It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the system of Chiussi using features, as taught by Odman, in order to ensure that all guaranteed bandwidth flows could be transmitted while meeting the resource requirements.

5. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chiussi (US 2003/0142624) in view of Odman (US 2003/0152059) as applied to claim 9 above, and further in view of Hill (US 2003/0035422).

Chiussi in view of Odman disclose the claimed limitations as described above.

Chiussi and Odman do not disclose the following features: regarding claim 9, wherein a contention resolution for said best effort data scheduling is based on bipartite graph matching.

Hill discloses a packet switching method including the following features.

Regarding claim 10, wherein a contention resolution for said best effort data scheduling is based on bipartite graph matching (see “scheduling of connectionless, best-effort packets ...based on maximum size and maximum weight bipartite graph matching algorithms” as recited in paragraph [0003]).

It would have been obvious to one of the ordinary skill in the art at the time of the invention to further modify the system of Chiussi and Odman using features, as taught by Hill, in order to create conflict-free connections between inputs and outputs of each timeslot (recited in Hill, paragraph [0003]).

Karawai discloses a packet switch, scheduling device, drop control circuit, multicast control circuit and QoS control device including the following features.

Regarding claim 11, a data switching device (see device shown in Fig. 1 and 4): a switching matrix to switch data from a plurality of inputs to a plurality of outputs (see switch 16 in Fig. 1); a plurality of multiplexers coupled to the plurality of inputs of the switching matrix (see multiplexer in the plurality of input buffer sections 12, which is connected to the matrix switch 16 as shown in Fig. 4); a plurality of best effort input buffers coupled as inputs to the plurality of multiplexers, each of the best effort input buffers to store best effort data (see Fig. 6, bottom queue within input buffer section 12



carries best effort class traffic); a guaranteed throughput input buffer coupled as another input to a first multiplexer of the plurality of multiplexers, the guaranteed throughput input buffer to store guaranteed throughput data (see Fig. 6, top queue within input buffer section 12 carries band guaranteed class traffic); and scheduling means coupled to the plurality of multiplexers (see scheduling sections 25 connected to the multiplexers, as shown in Fig. 4), the scheduling control means comprising: guaranteed throughput control means and best effort control means (see the scheduling and selected line management in scheduler section 25 connected separately to the bandwidth guaranteed traffic and the best effort traffic).

Regarding claim 12, a plurality of output buffers coupled to the plurality of outputs of the switching matrix (see output buffers 18 connected to the output of the switching matrix 16, as shown in Fig. 1), wherein each output buffer is configured to collect both guaranteed throughput and best effort data (see output buffer 18 accepting data of QoS 1-4 in Fig 1, wherein the QoS classes 1-4 include band guaranteed class and best effort class).

Karawai does not explicitly disclose the following features: regarding claim 11, wherein the scheduling control means comprises: guaranteed throughput control means coupled for controlling a guaranteed throughput data scheduling and best effort control means coupled for controlling a best effort data scheduling, characterized in that the guaranteed throughput and best effort control means are arranged for a combined control such that the best effort data scheduling is based on a contention free guaranteed throughput scheduling; regarding claim 13, wherein the guaranteed

throughput input buffer is configured to store only one unit of guaranteed throughput data at a time; regarding claim 16, wherein the best effort control means is further configured to schedule the best effort data after the guaranteed throughput control means schedules the guaranteed throughput data; regarding claim 17, wherein the guaranteed throughput control means is further configured to schedule the guaranteed throughput data in one step; regarding claim 18, wherein the one step comprises a reservation of at least one input of the switching matrix and or at least one output of the switching matrix.

Chiussi discloses a method for integrating guaranteed-bandwidth and best-effort traffic in a packet network including the following features

Regarding claim 11, guaranteed throughput control means coupled for controlling a guaranteed throughput data scheduling (see PWS 401 in Fig. 4) and best effort control means coupled for controlling a best effort data scheduling (see SWS 404 in Fig. 4), characterized in that the guaranteed throughput and best effort control means are arranged for a combined control (see PWS 401, combining GB flows 402 and BE flows via the SWS 404 in Fig. 4) such that the best effort data scheduling is based on a contention free guaranteed throughput scheduling (see “serves the BE aggregate only after having granted to the GB aggregate the sum of the guaranteed service shares of the allocated GB flows” recited in paragraph [0040]).

Regarding claim 13, wherein the guaranteed throughput input buffer is configured to store only one unit of guaranteed throughput data at a time (see Fig. 5, where each flow queue 502 only carries one GB flow).

Regarding claim 16, characterized in that the best effort scheduling is performed after the guaranteed throughput scheduling (see “serves the BE aggregate only after having granted to the GB aggregate the sum of the guaranteed service shares of the allocated GB flows” recited in paragraph [0040]; or see “first...the PWS 401 fulfills the bandwidth requirements of the GB flows” and “second...the PWS 401 distributes fair service to the plurality of BE flows” recited in paragraph [0043]).

Regarding claim 17, characterized in that the guaranteed data scheduling takes one step (see Fig. 4, where the GB flows gets scheduled by only going through the PWS scheduling step 401).

Regarding claim 18, the one step involves a reservation of inputs and/or outputs (see Fig. 4, where the PWS puts the GB flow within the subframe 407, and sending the frame to the outgoing link, thus reserving an output link for the GB flow).

Regarding claim 21, the data switching device further comprises a plurality of demultiplexers (see demultiplexers in input buffer sections 12 in Fig. 4) coupled to the plurality of best effort input buffers, wherein a first demultiplexer of the plurality of demultiplexers is also coupled to guaranteed throughput input buffer, wherein the first demultiplexer is configured to distribute data from an incoming data stream to a corresponding best effort input buffer or the guaranteed throughput input buffer (see demultiplexer in Fig. 4, which distributes data into the queue sections 0-M and as shown in Fig. 6, divide the data into band guaranteed class and the best effort class).

Odman discloses a method for handling asynchronous data in a wireless network including the following features.

Regarding claims 11, wherein the guaranteed throughput scheduling is contention free (see contention free period 530 in Fig. 5 which includes guaranteed time slots 540, which are used to transmit “isochronous” data, as recited in paragraph [0034]).

It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the system of Karawai using features, as taught by Chiussi and Odman, in order to ensure that all guaranteed bandwidth flows could be transmitted while meeting the resource requirements.

Karawai, Chiussi and Odman disclose the claimed limitations as shown above.

Karawai, Chiussi and Odman do not disclose the following features: regarding claim 14, wherein the best effort control means is further configured to disable best effort requests corresponding to the input of the switching matrix to which the first multiplexer is coupled for a frame during which the guaranteed throughput data is transferred through the switching matrix; regarding claim 15, wherein the best effort control means is further configured to disable best effort requests corresponding to the output of the switching matrix to which the guaranteed throughput data is transferred for a frame during which the guaranteed throughput data is transferred through the switching matrix; regarding claim 19, wherein the best effort control means is further configured to schedule the best effort data and three steps, wherein the three steps comprises a request step, a grant step, and an accept step; regarding claim 20, wherein

the best effort control means is further configured to schedule the best effort data using multiples of the three steps.

Dell discloses a three-stage switch fabric with buffered crossbar devices including the following features.

Regarding claim 14, wherein the best effort control means is further configured to disable best effort requests corresponding to the input of the switching matrix to which the first multiplexer is coupled for a frame during which the guaranteed throughput data is transferred through the switching matrix (see "...at most one bid from each input device, to determine which bids to grant...The bid arbitration...follows the rule...contending bids with lower priority...are rejected in favor of those with higher priority" recited in paragraph [0154], wherein the best effort data is considered lower priority than guaranteed bandwidth data; also see Fig. 18 showing that bids include both inputs and outputs of the crossbar, or switching matrix).

Regarding claim 15, wherein the best effort control means is further configured to disable best effort requests corresponding to the output of the switching matrix to which the guaranteed throughput data is transferred for a frame during which the guaranteed throughput data is transferred through the switching matrix (see "...at most one bid from each input device, to determine which bids to grant...The bid arbitration...follows the rule...contending bids with lower priority...are rejected in favor of those with higher priority" recited in paragraph [0154], wherein the best effort data is considered lower priority than guaranteed bandwidth data; also see Fig. 18 showing that bids include both inputs and outputs of the crossbar, or switching matrix).

Regarding claim 19, wherein the best effort control means is further configured to schedule the best effort data and three steps, wherein the three steps comprises a request step (see “a bid” recited in paragraph [0008]), a grant step (see “arbitrator determines whether to accept (i.e., grant)” recited in paragraph [0008]), and an accept step (see “If a bid is accepted, then a connection is eventually established” recited in paragraph [0008]).

Regarding claim 20, wherein the best effort control means is further configured to schedule the best effort data using multiples of the three steps (see paragraph [0008] explaining how each connection is scheduled using the three step of bid, grant, connect steps; thus multiple bids would be processed by the multiple of the three steps).

It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify they system of Karawai, Chiussi and Odman using features, as taught by Dell, in order to ensure traffic of higher priority can be transmitted.

### ***Conclusion***

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JUTAI KAO whose telephone number is (571)272-9719. The examiner can normally be reached on Monday ~Friday 7:30 AM ~5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kwang Yao can be reached on (571)272-3182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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